

# Cambio

Spectrum file converter and  
gamma spectrum analyzer

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# Functions

- File conversion
  - To read the spectrum data from different file formats and convert to other formats
- First analysis
  - To obtain a quick preview of spectral data

# Upload, convert and display

Nucleonica - Cambio file Converter - Windows Internet Explorer

http://www.nucleonica.net/Application/Cambio/Cambio.aspx

File Edit View Favorites Tools Help

Nucleonica - Cambio file Converter

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nucleonica ... web driven nuclear science

Applications Data Knowledge My Preferences Print Help New Browser New Alerts

Version: 2011.04.20 16:33:12

 **Cambio File Converter**

Cambio was developed in response to a need of nuclear emergency response analysts everywhere to be able to quickly read the data from any of a widely growing number of formats used by both commercial and government detector systems worldwide. As the number of manufacturers of nuclear detection instrumentation grows, so does the number of data formats that must be able to be read by emergency analysts. Manufacturers of instrumentation often need to create new and more complex versions of their own formats as technology advances and as new user requirements lead to new, more sophisticated instruments.

Convert a file Spectrum Spectral Data Sample Spectra Diagnostics About Cambio

**Step 1**  
Please select a file to be converted

**Step 2**  
Please upload the selected file

**Step 3**  
Choose the format to convert to (instrument / 3<sup>rd</sup> party software)  
laeaSpe

**Step 4**  
Convert the file using Cambio

**Step 5**  
Download the converted file

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Internet 100%

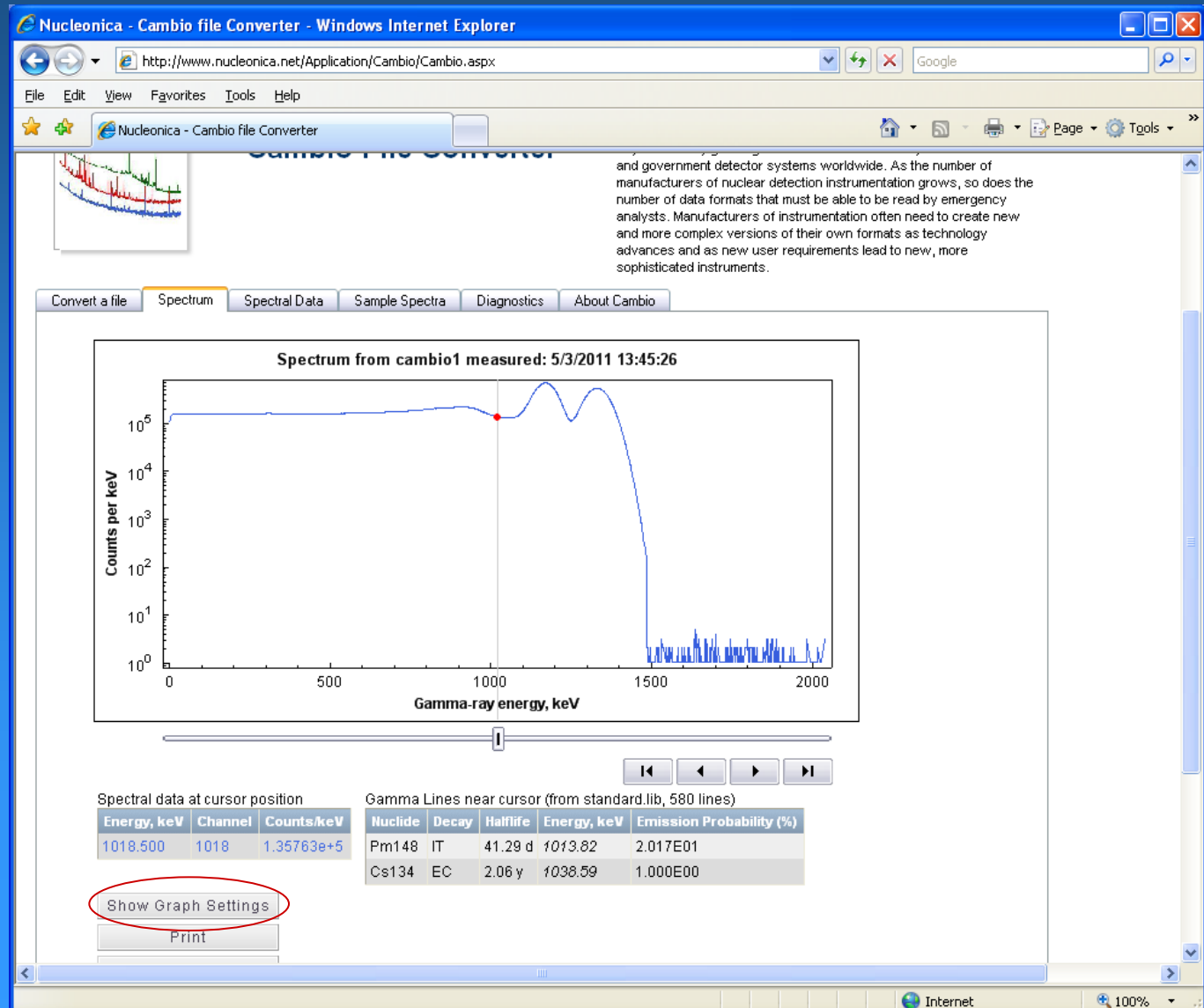
# Display spectrum

Select the tab:

Spectrum

Change the graph :

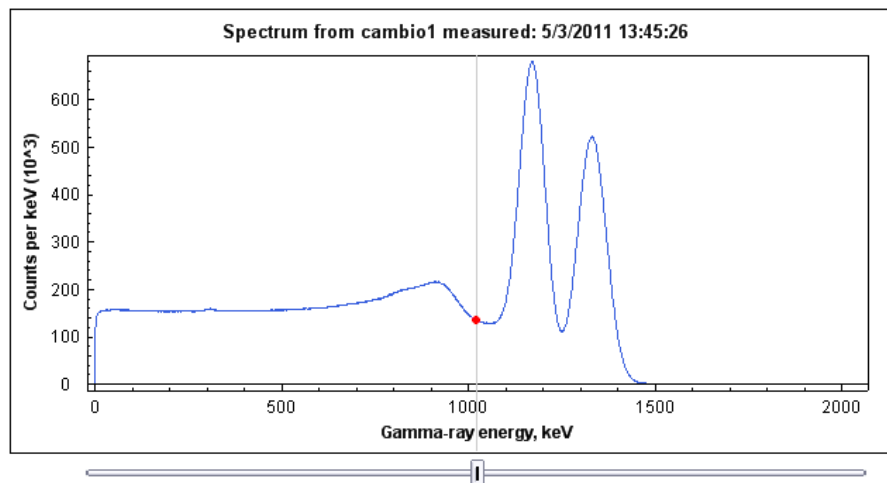
Show Graph Settings



# Exercise 1

- In the Networking area, My Groups add yourself to the group ITRAC-3
- Go to the ITRAC-3 group File Upload Area and download the file cambio1.chn file to your own computer (Ortec chn format)
- Convert the file to laeaSpe format
- Check the result
- Change the y-axis to linear

new user requirements lead to new, more sophisticated instruments.

[Convert a file](#)
[Spectrum](#)
[Spectral Data](#)
[Sample Spectra](#)
[Diagnostics](#)
[About Cambio](#)


Spectral data at cursor position

Energy, keV	Channel	Counts/keV
1022.500	1022	1.33910e+5

Gamma Lines near cursor (from standard.lib, 580 lines)

Nuclide	Decay	Half-life	Energy, keV	Emission Probability (%)
Pm148	IT	41.29 d	1013.82	2.017E01
Cs134	EC	2.06 y	1038.59	1.000E00

[Hide Graph Settings](#)[Redraw Graph](#)**Titles****Graph Title:**

Spectrum from cambio1 measured: 5/3/2011 13:45:26

**Category (X):**

Gamma-ray energy, keV

**Value (Y):**

Counts per keV

**General Graph Settings****Image Width:**

632

**Image Height:**

316

**Graph Style:****Axes**

Axis	Type	Min	Max
Y	<input checked="" type="radio"/> linear	0	1
	<input type="radio"/> log	<input checked="" type="checkbox"/> Auto scale Y	
X	<input checked="" type="radio"/> linear	0	7042
	<input type="radio"/> log	<input checked="" type="checkbox"/> Auto scale X	

**Gridlines and Ticks**

Category (X) Axis

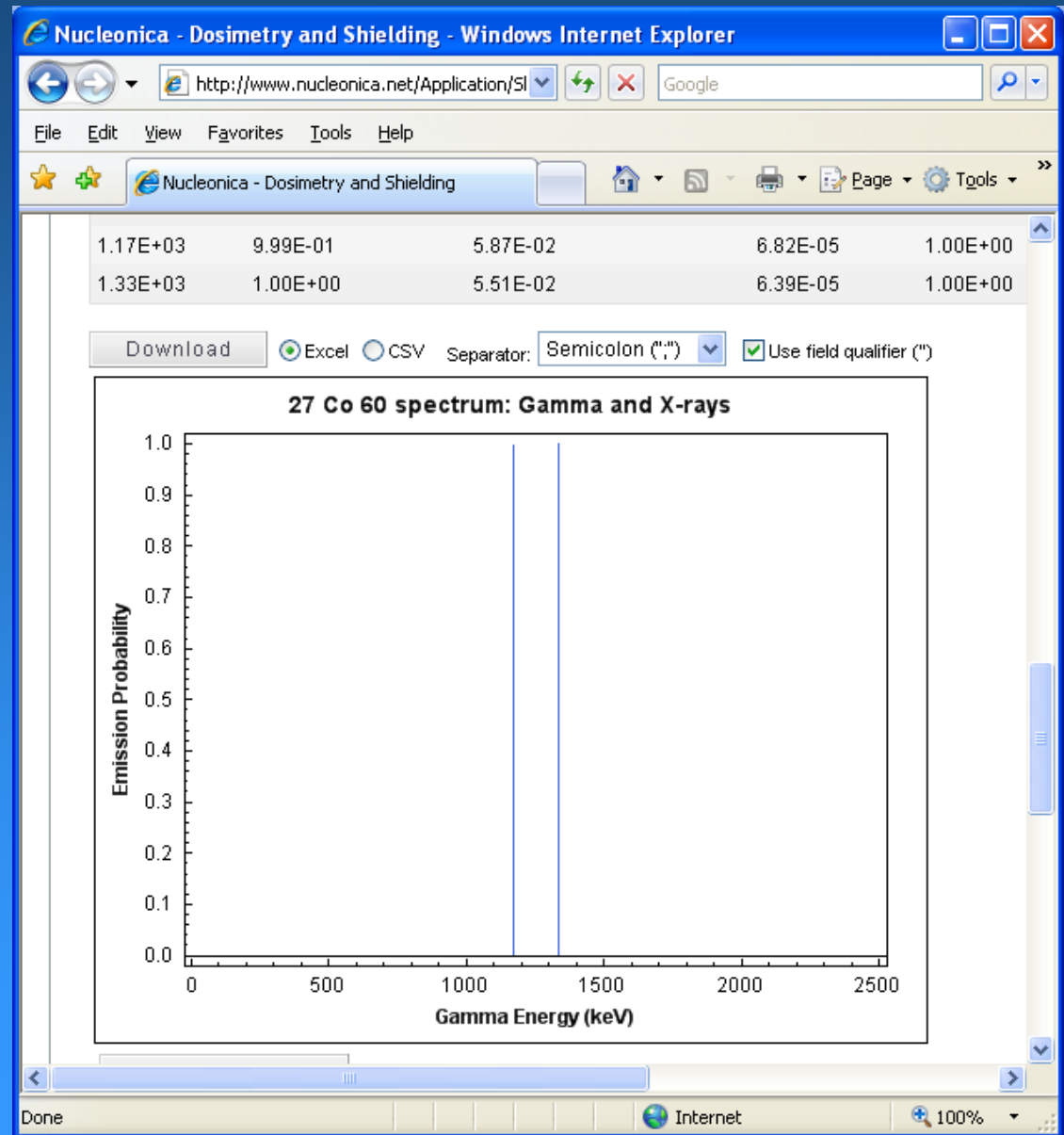
Value (Y) Axis

# Radionuclide Fingerprint

Energy lines of a radioactive nuclide

Fingerprint of a radioactive nuclide

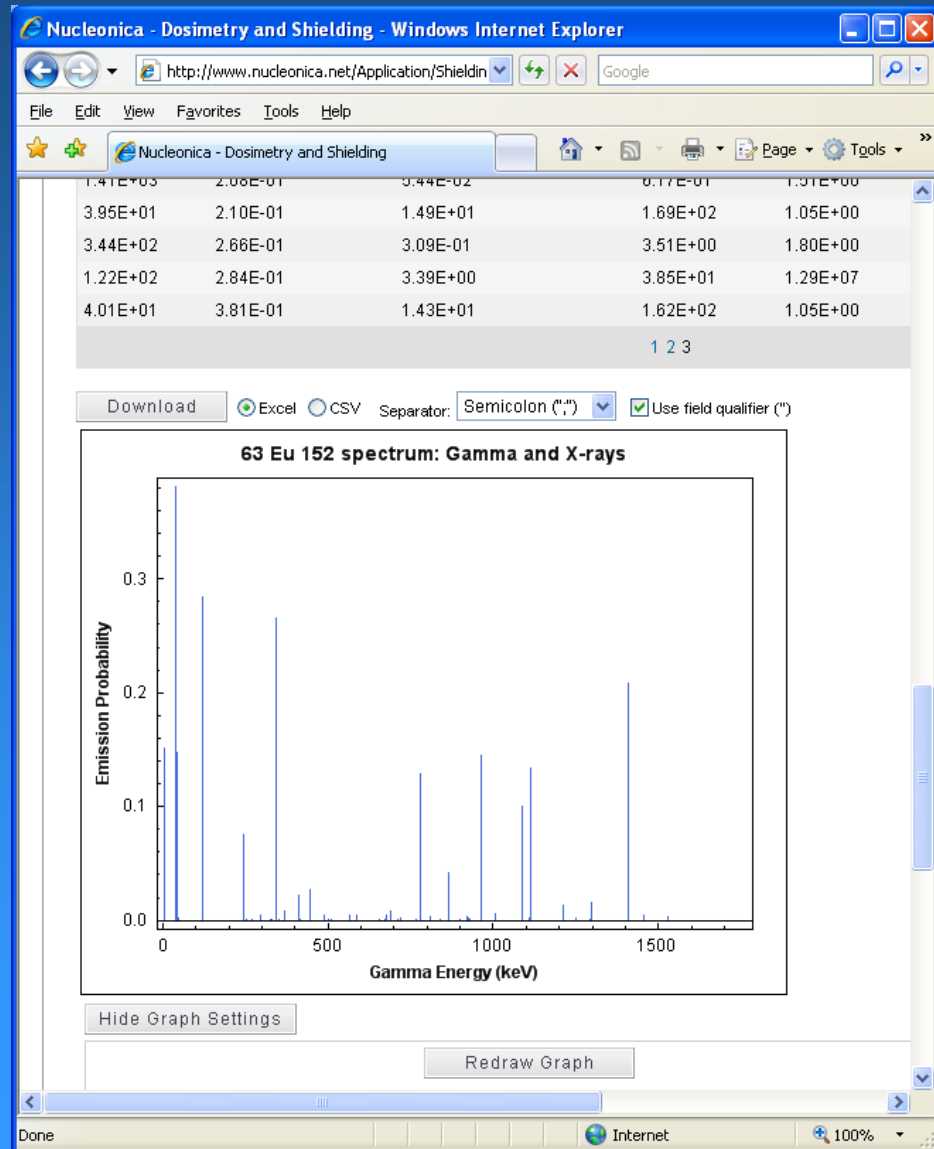
Can be used for identification of radioactive sources



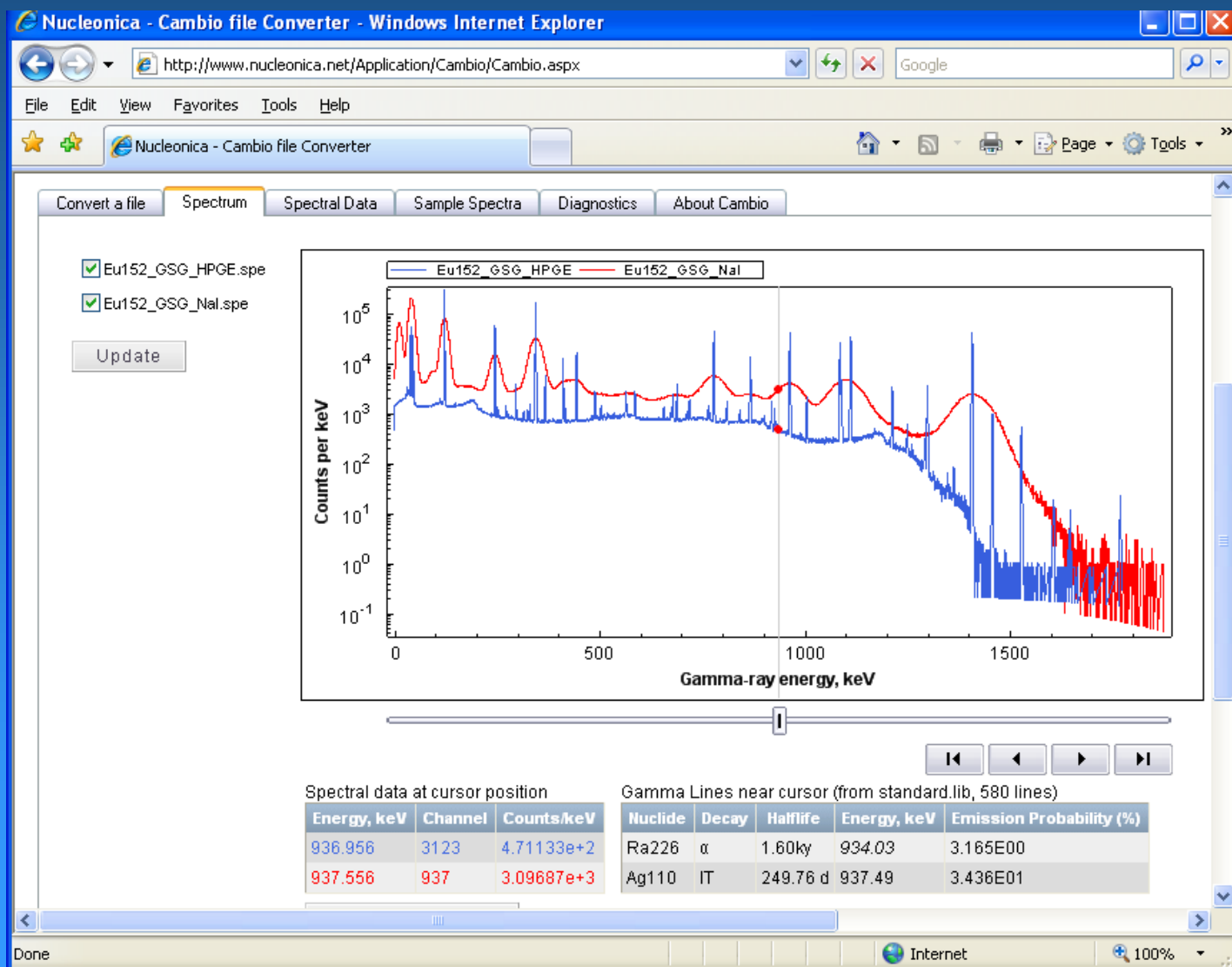
# Radionuclide Fingerprint

Sometimes many more lines

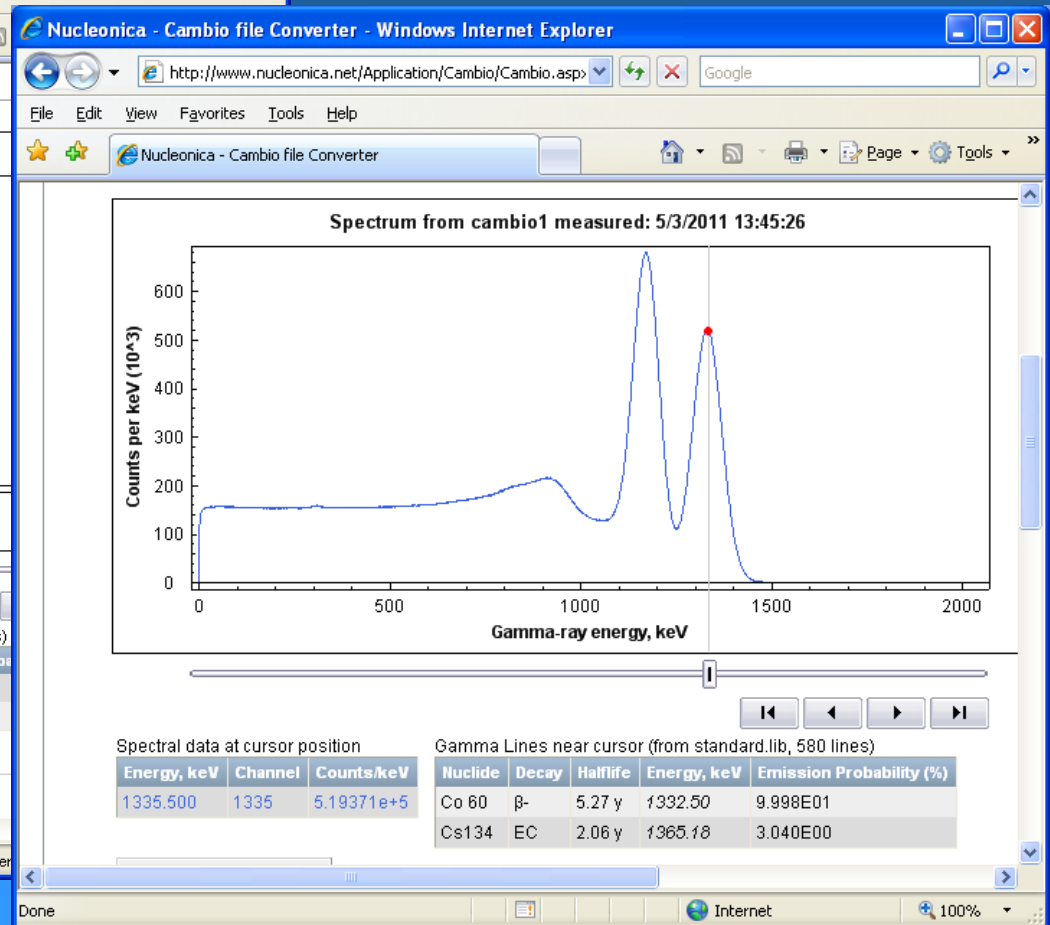
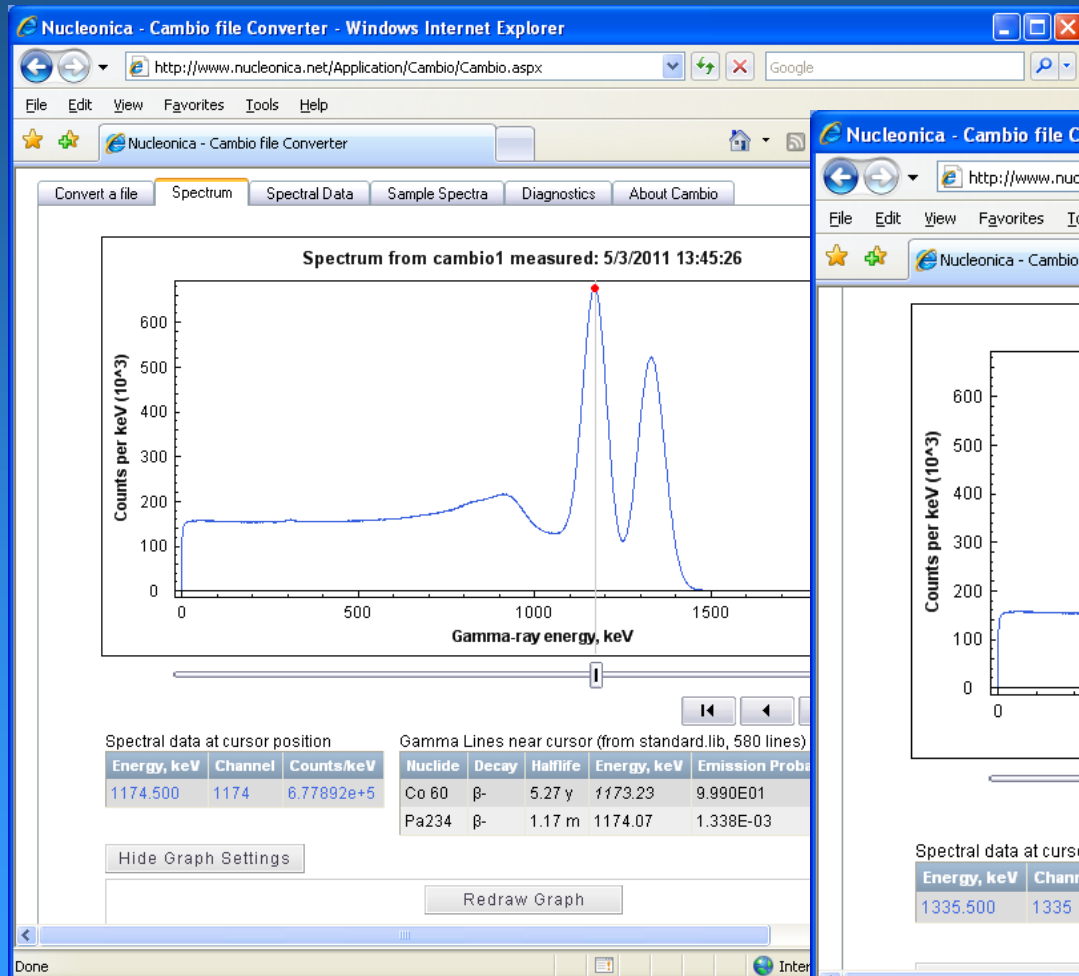
e. g. Radioactive Mixtures



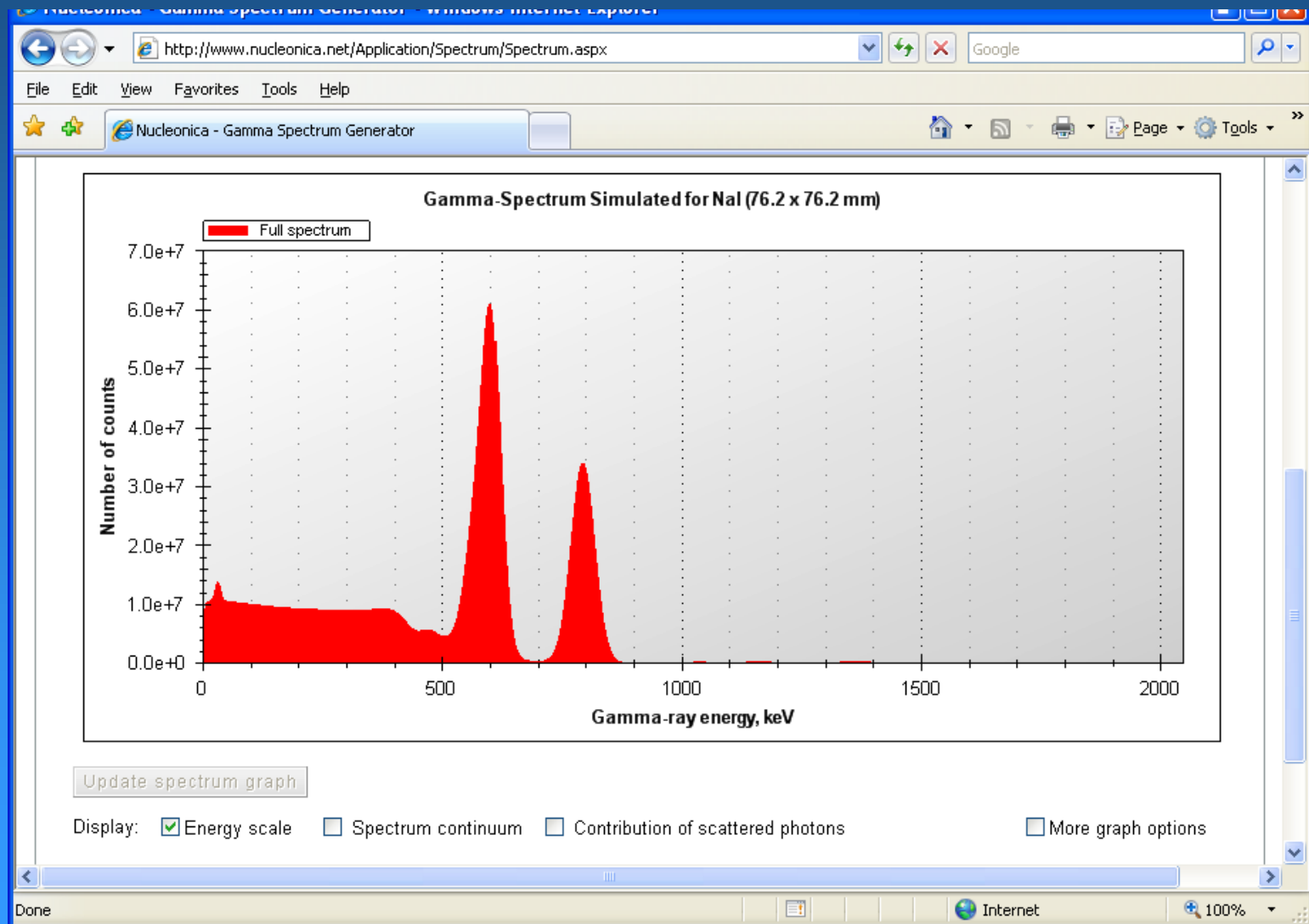
# Detector Sensitivity



# Gamma Spectrum Analysis with Cursor

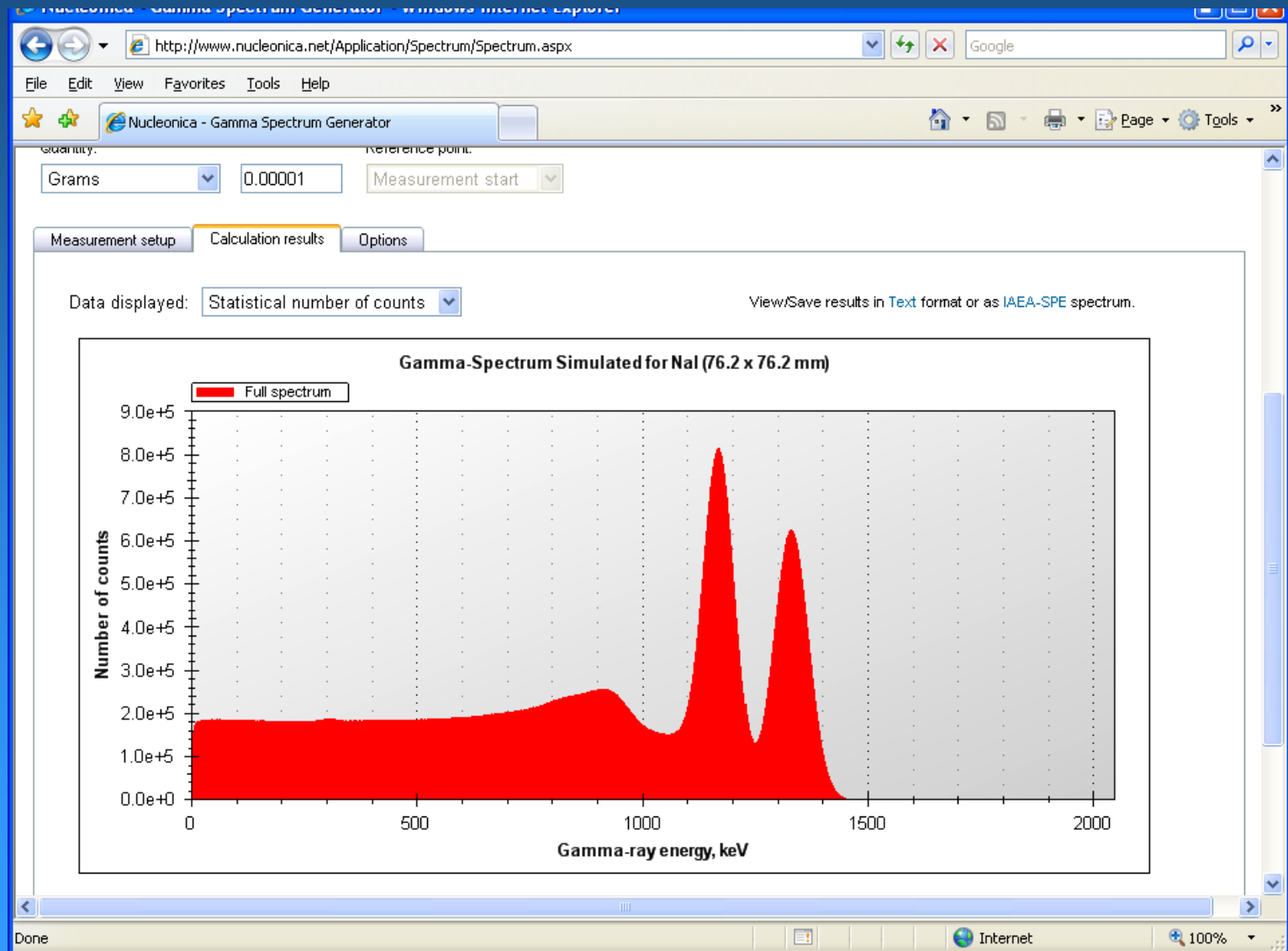


# Check with GSG Cs-134



# Check with GSG Co-60

Estimate the quantity



# Exercise 2

- Find in Sample Spectra tab the file cambio2.spe
- Perform an analysis
- It is known that the source is a mixture, coming from nuclear medicine and the measurement took 120 s

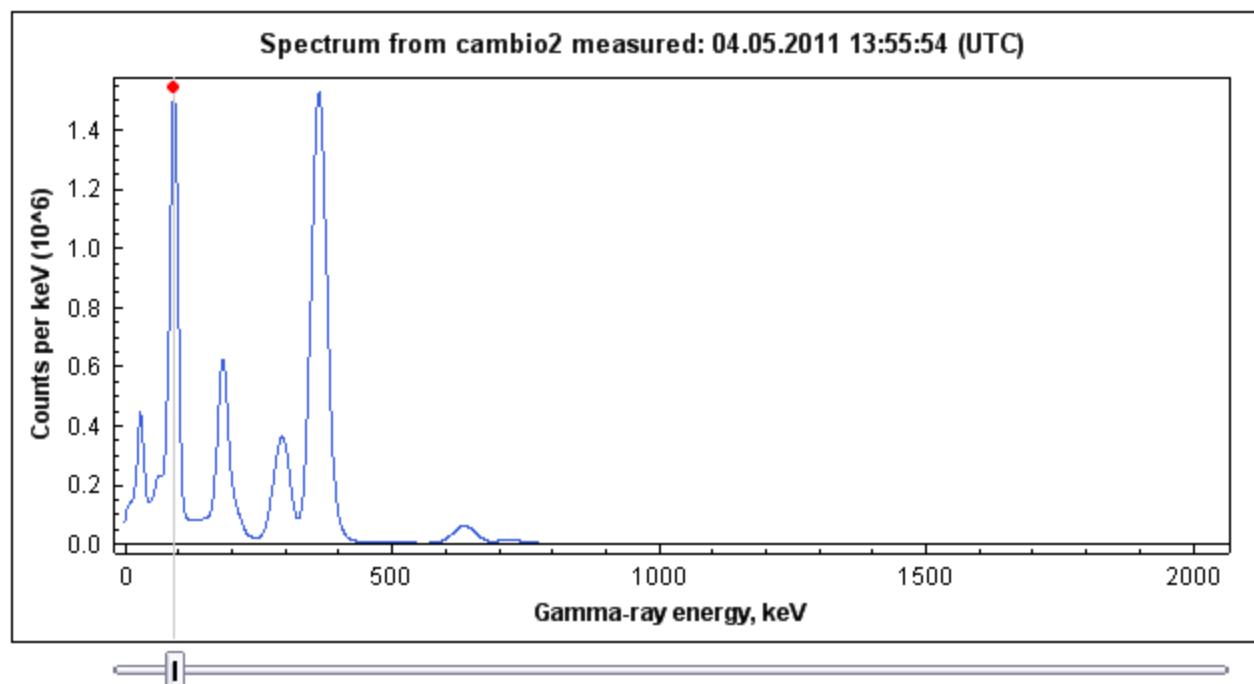
Convert a file Spectrum Spectral Data **Sample Spectra** Diagnostics About Cambio

- ☐ **Am-241unshielded 01.Spe** : Unshielded Americium 241 sample measured with a Germanium detector.
- ☐ **Ba-133unshielded01.Spe** : Unshielded Barium 133 sample measured with a Germanium detector.
- ☐ **BackgroundUnshielded.Spe** : Measured Background spectrum with a Germanium detector.
- ☒ **cambio2.spe** : I-131--G-67, 2.500E+008 Bequerel
- ☐ **Co60Ial.n42** : Cobalt 60 modeled spectrum (GSG module), measured with NaI detector and converted by Cambio.
- ☐ **Cs-137unshielded01.Spe** : Unshielded Cesium 137 sample measured with a Germanium detector.
- ☐ **Eu152\_GSG\_HPGE.spe** : Europium 152 modeled spectrum (GSG module with a Germanium detector), converted by Cambio
- ☐ **Eu152\_GSG\_Ial.spe** : Europium 152 modeled spectrum (GSG module) with a NaI detector, converted by Cambio
- ☐ **Pu-84%\_unshielded.Spe** : Unshielded 84% enriched Plutonium sample measured with a Germanium detector.
- ☐ **U-4%\_unshielded.Spe** : Unshielded 4.46% enriched Uranium sample measured with a Germanium detector.
- ☐ **U-natural\_unshielded.Spe** : Unshielded natural Uranium sample measured with a Germanium detector.

- ☒ **medical.lib**: 10 nuclides, 65 lines
- ☐ **natural.lib**: 18 nuclides, 272 lines
- ☐ **standard.lib**: 77 nuclides, 580 lines

Display Spectra

Convert a file Spectrum Spectral Data Sample Spectra Diagnostics About Cambio



Spectral data at cursor position

Energy, keV	Channel	Counts/keV
92.500	92	1.54874e+6

Gamma Lines near cursor (from medical.lib, 65 lines)

Nuclide	Decay	Half-life	Energy, keV	Emission Probability (%)
Ga 67	EC	3.26 d	91.26	2.953E+00
Ga 67	EC	3.26 d	93.31	3.700E+01

